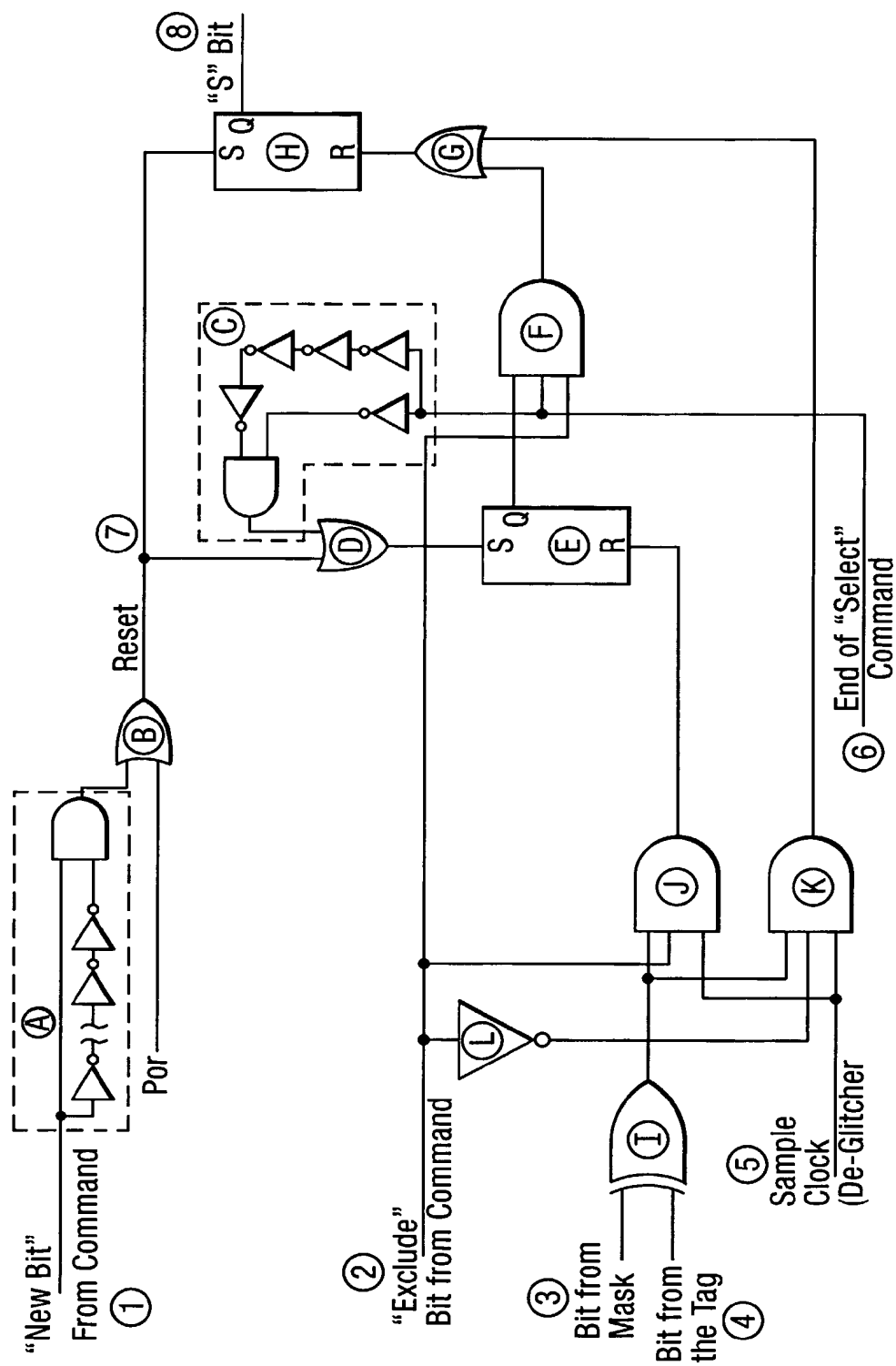


Fig.2.

| Command | parameters | | | | |
|------------------|------------|-----|-----|-------------|------|
| <i>Reset</i> | | | | | |
| <i>Query</i> | Select | | | | |
| <i>Select</i> | Exclude | New | Ptr | Mask Length | Mask |
| <i>Connect</i> | | | Ptr | Mask Length | Mask |
| <i>Ack</i> | Argument | | | | |
| <i>Singulate</i> | Argument | | | | |

Fig. 3.



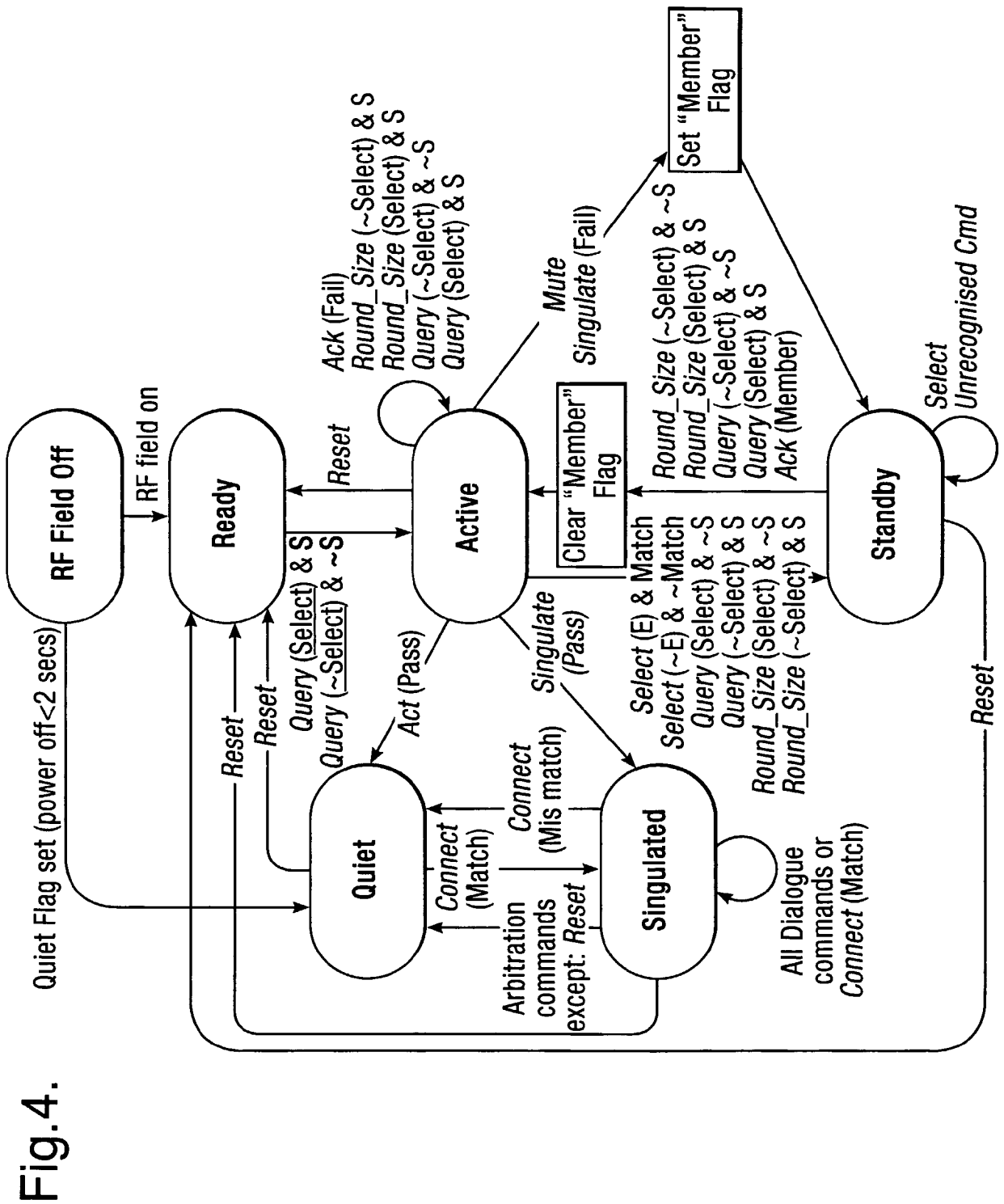


Fig.5.

| State | Description | Commands to which responsive |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RF FIELD OFF | The Tag is out of the RF field or the Reader Tx Carrier is switched off for longer than 300 μ S @ 25°C. | None. |
| READY | The Tag is in an RF field, its clock is running and it is waiting for a <i>Query</i> command to enable its participate in Arbitration. | <i>Query</i> (Select) & S <i>Query</i> (~Select) & ~S |
| ACTIVE | The Tag steps its internal hold-off circuitry and will transmit if it has reached its turn to transmit. | Responsive to all Arbitration commands. |
| STANDBY | ACTIVE state is suspended. The tags internal hold-off circuitry has stopped stepping. When exiting this state due to any of the Arbitration commands listed on the right the tag will immediately resume stepping its internal hold_off and retry. | <i>Round_Size</i> (~Select) & ~S <i>Round_Size</i> (~Select) & ~S <i>Query</i> (~Select) & ~S <i>Query</i> (~Select) & ~S <i>Ack</i> (Member) |
| SINGULATED | The Tag has been singulated by a <i>Singulate</i> command with valid acknowledge values or by a <i>Dialogue</i> command. The Tag can process <i>Read_Blocks</i> or <i>Write_Block</i> Dialogue commands. | All commands. <i>Reset</i> will move Tag to the READY state, all other Arbitration commands will move the Tag to the QUIET state. The <i>Read_Blocks</i> command will read the number of blocks specified as a command parameter and will leave the Tag in the SINGULATED state. The <i>Write_Block</i> command will write 32 bit data to the block specified as a command parameter and will leave the Tag in SINGULATED state. The <i>Dialogue</i> command will move the Tag to the QUIET state if the Mask in the command does not match the tags data, or will leave the Tag in SINGULATED state if the Mask matches. |
| QUIET (Persistent Sleep) | Tag is not responsive to any Arbitration commands except <i>Reset</i> . It can only return to active population after being removed from the RF field for an extended period of time typically greater than 2 seconds or on receiving a <i>Reset</i> command – either of these being followed by a <i>Query</i> command. This QUIET state will be maintained in the absense of RF power for at least 2 seconds. | <i>Reset</i> |

Fig.6.

| Reader Command | Tag Operation |
|------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>Reset</i> | Moves the Tag from any current state to READY state. |
| <i>Query</i> | This command initialise the start of the arbitration sequence and tells Tag over how many internally timed slots to randomise the transmit slot selection. The Tag chooses its response slot. If the Select bit in the command set and the tag's internal "S" flag is set, or if the Select bit in the command is clear and the tag's internal "S" flag is clear this command causes the Tag to move from the READY to the ACTIVE state or from the STANDBY to the ACTIVE state. If the tag has moved to the ACTIVE state and has chosen the 1 st internally timed slot as its Response slot, the Tag will send its Response to the Reader immediately after receiving this command. |
| <i>Round_Size</i> | Causes the Tag to change the number of pseudo-slots over which it randomises its transmissions if it is in the ACTIVE state. The Tag chooses its Response slot number. Tags in the READY state will ignore this command. If the Tag is in the ACTIVE state and has chosen the 1 st slot as its Response slot, the Tag will send its Response to the Reader. If the Tag is in the STANDBY state and has chosen the 1 st slot as its Response slot, the Tag will send its Response to the Reader. |
| <i>Select</i> | |
| <i>Connect</i> | |
| <i>Ack</i> | Acknowledges the successful reception of a Tag transmission by the Reader when valid ie. when received by a Tag which has just transmitted, and when the command is received in the timing window and when the Signature matches that sent by the tag in its Response, causing the Tag to move from the ACTIVE to the QUIET state. Causes a Tag in the STANDBY state to move to the ACTIVE state if its Member flag is set. |
| <i>Singulate</i> | Acknowledges the successful reception of a Tag transmission by the Reader when valid ie. when received by a Tag which has just transmitted, and when the command is received in the timing window and when the Signature matches that sent by the tag in its Response, causing the Tag to move from the ACTIVE to the SINGULATED state. Causes all other the Tags in the active population to move to the STANDBY state. In this state the Tag is singulated and the Reader can communicate with it using Dialogue commands with the rest of the tags that were in the active population move to the STANDBY state. , in which they will remain until they detect any Arbitration command (with matching selection criteria for Begin_Round, Init_Round and FST_Round commands). If a valid Arbitration command is received, these Tags will move from the STANDBY state to the ACTIVE state. If a Begin_Round, Init_Round or FST_Round command is received with a mismatch in its selection arguments, these Tags will move from the STANDBY state to the READY state. |
| <i>Mute – this is not an actual command but is an implied command derived from the first low-going pulse of any command.</i> | The Tag will move to the STANDBY state upon reception of the first low-going pulse of any command. This could be any single pulse or the first pulse of the SOF of a valid command. The Tag will continue to decode the command and if the pulse turns out to be part of a valid command, the Tag respond as described for the particular command in this table. as follows: a) If the tag received a <i>Reset</i> command it will move to the READY state, b) If the tag received a <i>Round_Size</i> , <i>Query</i> of <i>Select</i> command and the it will move to the READY state, or the ACTIVE state depending on the actual command and the command parameters. |

Fig.7.

| Reader Command | Conditions | Tag Response |
|----------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Select | Exclude bit = 0 New bit = 0 | The 'S' flag in the tag is set if the mask matches the relevant portion of the tag data memory. The 'S' flag will be reset if there is no match |
| | Exclude bit = 1 New bit = 0 | The 'S' flag in the tag will be reset if the mask matches. If the mask matches. If the mask does not match, then the flag will remain in its previous condition. |
| | Exclude bit = any value New bit = 1 | This causes a fresh selection process to take place. The tags matching the mask will have their 'S' flag set or reset according to the value of the Exclude bit and will over-ride any previously selected condition. This command may be used to take an new inventory of tags which have already undergone an inventory but are remain in the reader field. |

Fig.8.

